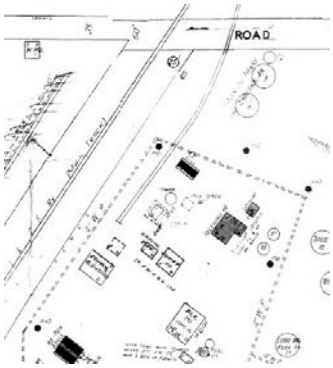
WILCOX UPPER PROCESS AREA

Sheets 7A-7B

Location

Location Description

- Northwest corner of the Wilcox Refinery Property.
- 1923 Sanborn Map
  - Tool shed, office/laboratory
  - Well and pump
  - Boiler and cooling tower.
- 1961 Sanborn Map (See Inset)
  - Process Area including:
    - Stills
    - "Iron Oil Tanks"
    - Towers
    - Receiving building
    - Ethyl blending building
  - Tank Sizes:
    - 2 – 2,500 Barrel tanks.



1961 Sanborn Map
Area contains stills, a tower, tanks, and ethyl blending area.

Test Pit/Boring Log Observations

- Test Pit Observations
  - Dug to 1.5 - 2 feet bgs to allow access for ROST.
  - Many pipe runs just below the surface
  - Most pits contain a thin 4-6 inch layer of topsoil followed by a reddish brown low plasticity clay.
  - Several pits contained a "slag" material either in chunks or in a thin layer.
    - Slag found in: WIL-06
- Boring Logs and Samples
  - WIL-05 (Sheet 7A)
    - 0-2 ft bgs under a thin layer of topsoil, material was stiff, dry, low plasticity brown clay.
    - 2-6.5 ft bgs stiff dry red medium plasticity clay.
    - 6.5-14 ft bgs soft dry gray and red clay and fine sand, non-plastic. Wet at 10 ft bgs.
    - 14-16 ft bgs stiff dry low plasticity red and gray clay
    - Maximum PID reading was 4.5 ppm between 12 and 14 feet.
    - Sample results (Sheet 7B) were minimal, with only methylene chloride, phenanthrene, and pyrene being detected, well below the project action limits. The type of source material cannot be determined from this sample.
  - WIL-25 (Sheet 7A)
    - 0-2.5 ft bgs dark brown to brown soft clay little fine sand and slag.
    - 2.5-14 ft bgs dry, red, low plasticity clay with some fine sand.
    - 14-15 ft bgs stiff dry red and gray low plasticity clay.

WIL-06 Test Pit
Picture shows black slag like material at 7-8 inches bgs. (At end of PID strap)

WIL-05 14-15 ft bgs

- 15-20 ft bgs not logged due to wet, non-cohesive sandy "soup". May have encountered water table or perched aquifer.
- Maximum PID reading was 5.5 ppm between 8 and 10 ft bgs.
- Sample results (Sheet 7B) were minimal, with only methylene chloride, naphthalene, and 2-methylnaphthalene being detected, well below the project action limits. The type of source material cannot be determined from this sample.

o WIL-29 (Sheet 7A)

- 0-1 ft bgs thin layer of topsoil on dark gray sandy silt, some slag.
- 1-2 ft bgs medium stiff dry medium plasticity red clay with a trace of very fine sand.
- 2-2.5 dark gray fine sand and silt, hydrocarbon odor noted.
- 2.5-6.5 medium stiff dry gray clay and fine sand. Sweet hydrocarbon odor noted.
- 6.5-7.8 soft gray medium plasticity clay. Strong sweet hydrocarbon odor noted.
- 7.8-10 stiff dry reddish-brown and gray non-plastic clay.
- Maximum PID reading was 420 ppm between 6 and 8 ft bgs.
- Sample results (Sheet 7B) indicate the presence of a wide range of hydrocarbons, most likely from a crude oil or mixed contamination. Both light and heavy hydrocarbons were detected above project action limits:
  - Benzene, ethylbenzene, xylenes
  - Benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene.

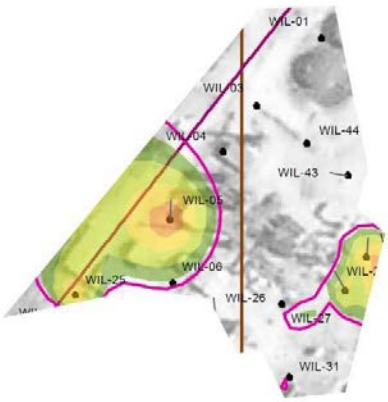
WIL-29
6-7 ft bgs

Topography

- Surface drainage is toward the south/southwest towards the railroad bed.
- The groundwater table may have been encountered during subsurface investigation at WIL-25 at between 15-20 ft bgs.
- Depth to bedrock/refusal was generally between 10 and 18 feet bgs.

ROST Results (Sheet 7A)

- Contamination was indicated in WIL-05, WIL-25, WIL-28 and WIL-29.
- Based on the 2-D max contamination model, it is probably that the contamination in WIL-05 and WIL-25 originated on the Lorraine Site. The topography, including the railroad bed indicates a dip in the bedrock from the Lorraine Site towards the Wilcox site. It is probably that residual contamination has traveled down the bedrock slope onto the Wilcox site.
- Contamination in WIL-28 and WIL-29 appears to be a continuation of the contamination from the Product Storage Area to the northeast. The contamination is shallow, between 3 to 10 ft bgs.



2D Max Contamination
Shown on 1951 aerial photograph.

Environmental Impacts/Conclusions

- The contamination in this area is primarily due to impacts from other areas addressed in this investigation.
- Impact from the Lorraine contamination may be impacting groundwater under the railroad bed. Drainage from the railroad bed is to the south/southwest directly to Sand Creek.
- Impact from the product storage area contamination is discussed in the Product Storage Area section.
- Minimal impact was noted from the ethyl blending area.

Data Gaps

- The results from WIL-05 highlight the difficulties in comparing standard sampling techniques versus *in-situ* techniques. Due to sample volume requirements and other limitations, it is very difficult to sample thin layers of contamination without dilution. Also, the sampler cannot ensure that the exact same interval has been sampled due to inherent errors built into coring techniques including fall back, and uneven compression of cores.
- ROST detects multi-ring PAH compounds. These compounds are present in all refined fractions, e.g. gasoline, kerosene, fuel oils, and lubricating oils which makes ROST particularly suitable for assessing these mixtures. Of notable exception, however, are single ring aromatic compounds, e.g. benzene, toluene, ethylbenzene, and xylene etc. which most refineries separate into their pure forms. Of these compounds, Sanborn maps indicate that there were product storage tanks exclusively for benzene. If there is a release of pure benzene or other single ring compound, it would not be detected by ROST.
- Groundwater from this area has not been evaluated.
- Due to heavy growth, concrete building foundations and debris, the interior of the process area could not be accessed for ROST testing. Sampling was designed to determine if material from the process area was impacting surrounding areas. No indication of impact from the operation of this area was found. The area inside the process area could still contain residual contamination.
- The ethyl blending area remains a concern due to the inability to investigate the subsurface under the building. Tetraethyl lead (TEL) was used to blend with gasoline to control the combustion rate of the fuel. TEL is extremely hazardous.

Recommendations

- Further sampling should be performed in the center of the process area, after demolition and clearing, to verify that no contamination remains.
- Further sampling should be performed under the ethyl blending building after demolition and clearing to verify that no TEL or other contamination remains.